

TS1 Series

Miniature two axis Hall effect joystick

MAIN FEATURES

- Hall effect sensing
- One or two axis
- IP67 above panel sealing
- Tight center tolerance: $\pm 50\text{mV}$
- Full voltage outputs at center positions
- Analog or USB outputs



The TS1 Series is a miniature two axis joystick incorporating Hall effect sensing to deliver precision linear outputs with exceptional return to center values up to 2.5m lifecycles. Featuring an integrated elastomer actuator assembly with a threaded body mount, this thumb operated joystick provides IP67 above panel sealing as standard. The TS1 Series' compact size makes it ideally suited for integration into industrial gamepads, wireless remote controls and hand grip joystick assemblies.

SPECIFICATIONS*

MECHANICAL (X & Y) AXIS	
Angular travel:	45° total (22.5° each direction from center)
Expected life:	2.5 million operations
Centering:	Spring return
Mass/weight:	20 grams**
Maximum vertical load:	67.5 lbf
Maximum horizontal load:	50 lbf***

* Specifications subject to change without notice

** Approximate weight. Actual weight dependent on configuration

*** Measured at 0.62" above panel surface

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Ruffy Controls, Inc.
3258 Grey Hawk Ct., Carlsbad, CA 92010
ruffycontrols.com

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SPECIFICATIONS

ELECTRICAL	
Technology:	Hall effect sensor
Resolution:	12 bit
Supply voltage:	5.00VDC +/- 0.01VDC regulated transient free
Supply current:	20mA max
Ratiometric output voltage:	See output options
Return to center voltage tolerance:	+/- 50mV initial
Transient overvoltage max:	20VDC
Reverse polarity max:	-10VCD
Output impedance:	2Ω
Start up time:	15ms max

PUSHBUTTON SWITCH	
Electrical life:	300,000 cycles
Electrical rating:	50mA, 12VDC
Actuation force:	1.15 lbf

ENVIRONMENTAL	
Operating temperature:	-40°C +85°C
Storage temperature:	-40°C +85°C
Above panel sealing:	IP67
EMC immunity level:	EN61000-4-3 Compliance to 30A/m
EMC emissions level:	EN6100-4-3

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SPECIFICATIONS

ENVIRONMENTAL (cont.)	
ESD immunity level:	EN61000-4-2 Compliance to +/-15kV/+/-8kV
Vibration:	Per SAE J1455 Section 4.9 & MIL-STD810G 514.6
Mechanical shock:	Per SAE J1455 Section 4.10 & MIL-STD-202G

MATERIALS	
Plastic housing:	Mineral & glass filled nylon
Metal housing:	Gold anodized aluminum
Boot & actuators	Silicone (with tear resistant additive)

CONNECTIONS	
Housing body:	Friction lock PCB header (Molex 530480510)
Mating wire harness:	10" 28AWG PTFE to five position connector housing (Molex 510210500)

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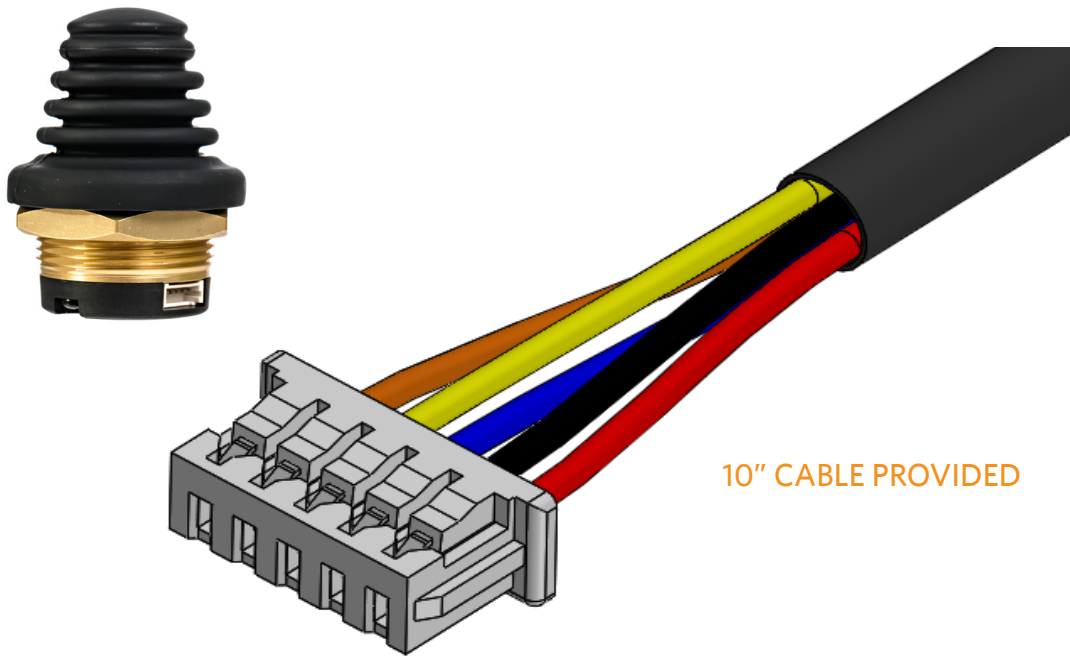
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PINOUT & MATING WIRE HARNESS



WIRE COLOR & DESCRIPTION		
PIN #	COLOR	DESCRIPTION
1	RED	Power (+5VDC)
2	BLACK	Ground & pushbutton common
3	BLUE	X Axis Sensor
4	YELLOW	Y Axis Sensor
5	ORANGE	Pushbutton

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USB OUTPUT OPTIONS

Output option 5: USB Joystick (HID Game Controller)

Featuring USB 1.1 HID compliant interface, Output Option 5 provides HID “game controller” interface. Adhering to the HID specification, USB game controllers are plug-and-play with most versions of Windows. Joystick button and axis assignments are dependent upon the controlled application. Ruffy Controls’ USB joysticks are compatible with Linux, although system compatibility is not guaranteed. The user is responsible to verifying specific Linux OS compatibility.



OUTPUT OPTION 5	
Output Option:	5
Protocol:	USB HID 1.1 Game controller
Resolution:	10 bit
Supply voltage:	5VDC via USB cable
System support:	WINDOWS (all), OSX, Linux
Termination:	• USB male type A to right angle mini B • 5ft (60”) length (mini B to joystick)

Output option 6: USB Joystick (HID Game Controller)

The Cursor Control option programs the joystick to function as a USB mouse/pointing device.

OUTPUT OPTION 6	
Output Option:	6
Protocol:	USB HID compliant “mouse” pointing device
Supply voltage:	5VDC via USB cable
System support:	WINDOWS, OSX, Linux

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TS1 SERIES PART NUMBER CODE



Stepped



Scooped



Pushbutton



Castle

ACTUATOR OPTION	
1	STEPPED CAP
2	SCOOPED CAP
3	PUSHBUTTON
4	CASTLE CAP

HOUSING OPTION	
M	THREADED HOUSING, METAL
P	THREADED HOUSING, PLASTIC
D	DROP-IN*
R	REAR MOUNT*
A	DROP-IN & REAR MOUNT

OUTPUT OPTION	
1	0V - 5V
2	0.5 TO 4.5V
3	0.25V TO 4.75V
4	1V TO 4V
5	USB
6	CURSOR CONTROL

LIMITER OPTION	
S	SQUARE □
R	ROUND ○
G	GUIDED FEEL (-/+)
X	X LIMITER ⇐
Y	Y LIMITER ⇓

ACTUATOR COLOR	
BK	BLACK
GY	GREY

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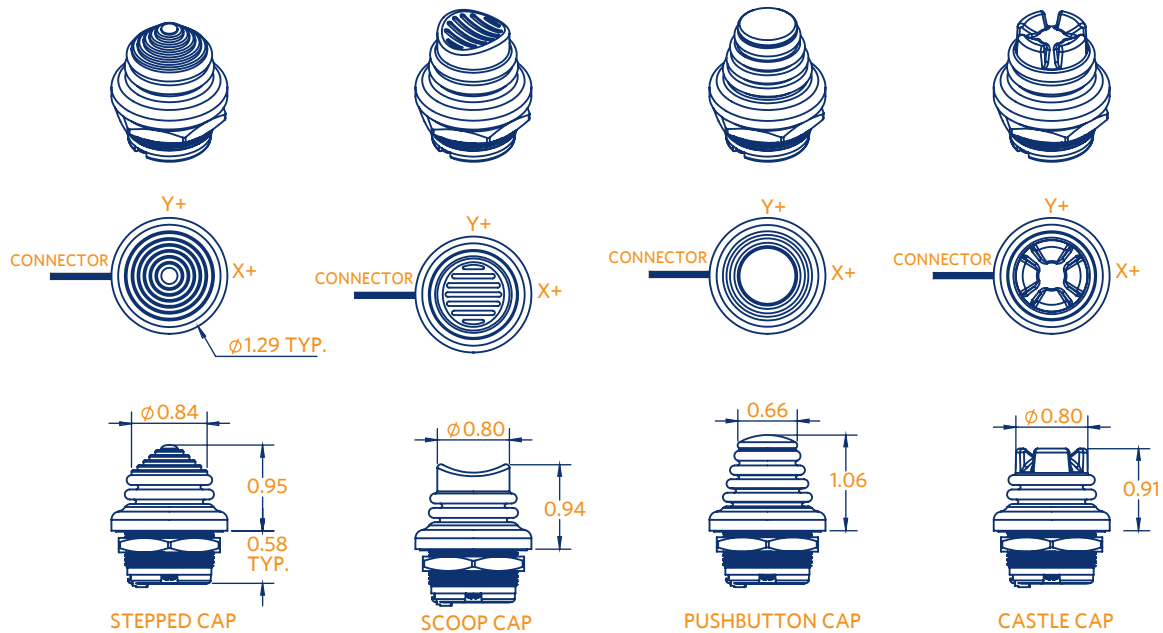
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ACUATOR OPTIONS



LIMITER PLATE OPTIONS



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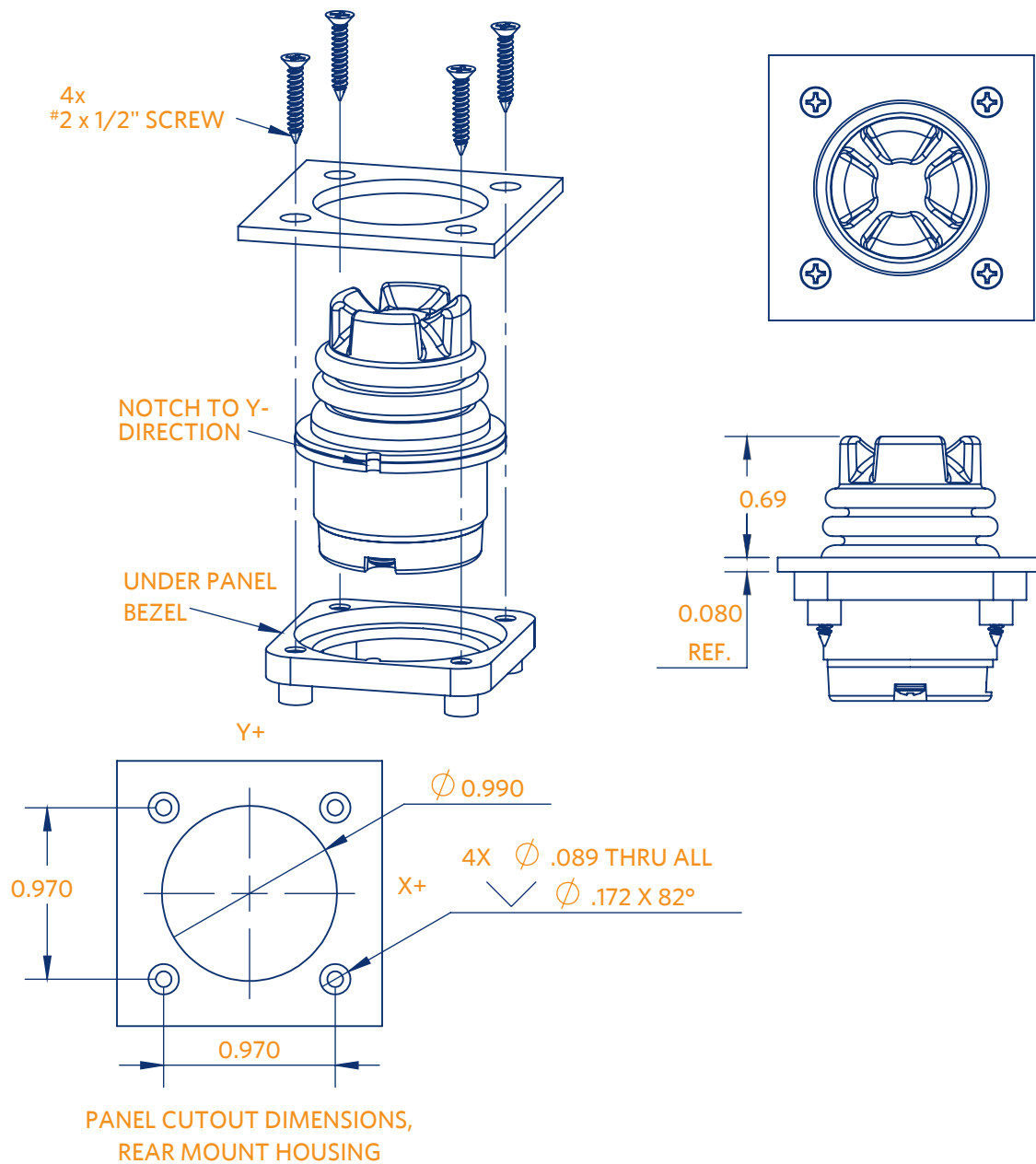
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HOUSING OPTIONS - REAR MOUNT



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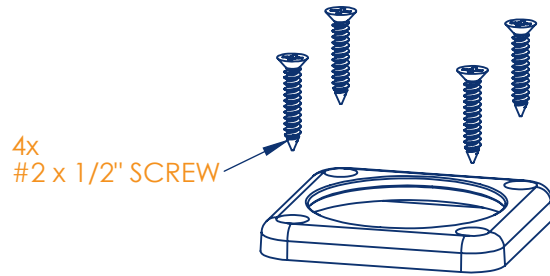
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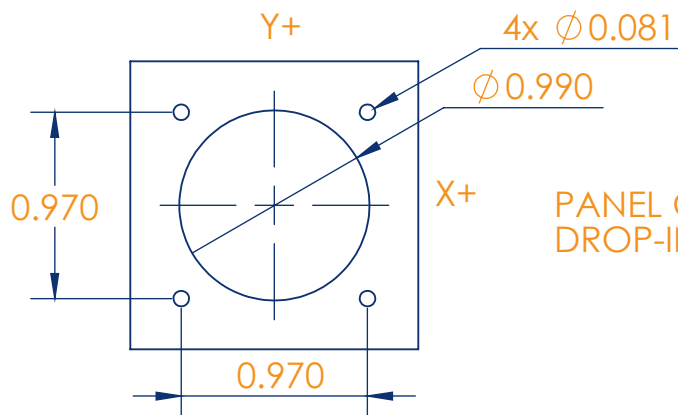
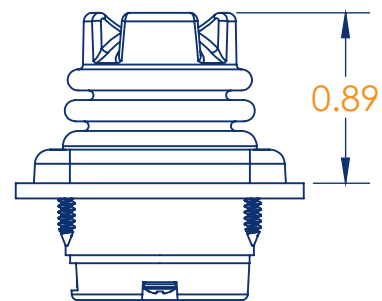
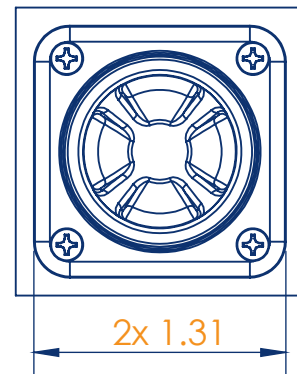
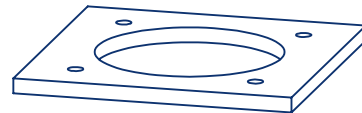
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HOUSING OPTIONS - DROP-IN



NOTE:
NOTCH TO Y-
DIRECTION

PANEL GASKET



PANEL CUTOUT DIMENSIONS
DROP-IN HOUSING

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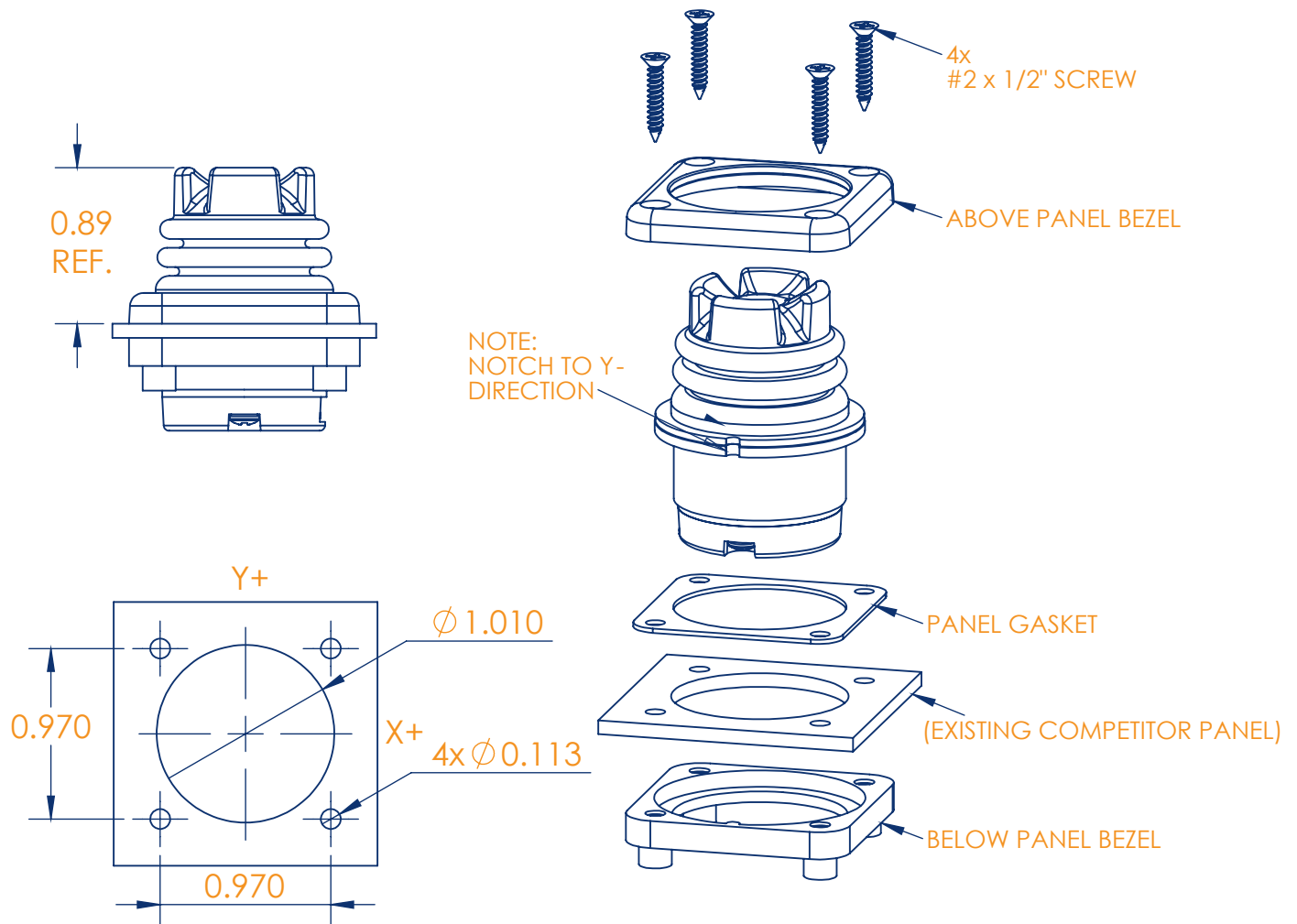
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REPLACING EXISTING CUSTOMER WITH RUFFY TS1 DROP-IN MOUNT



COMPETITOR PANEL DIMENSIONS

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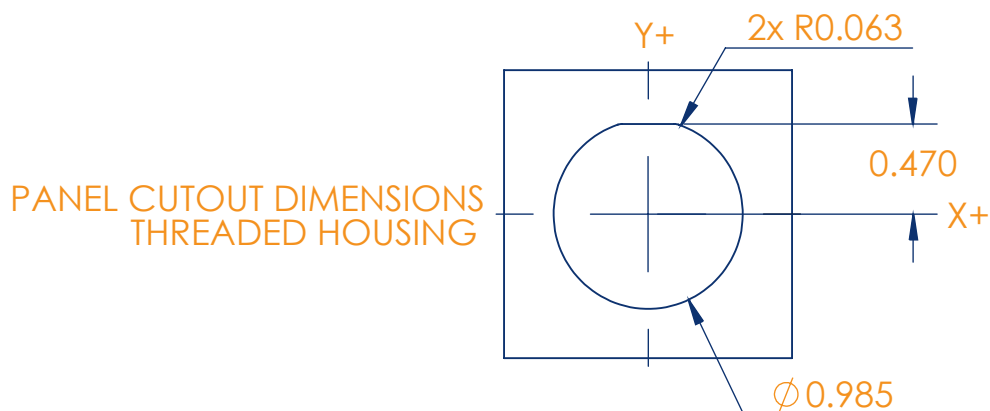
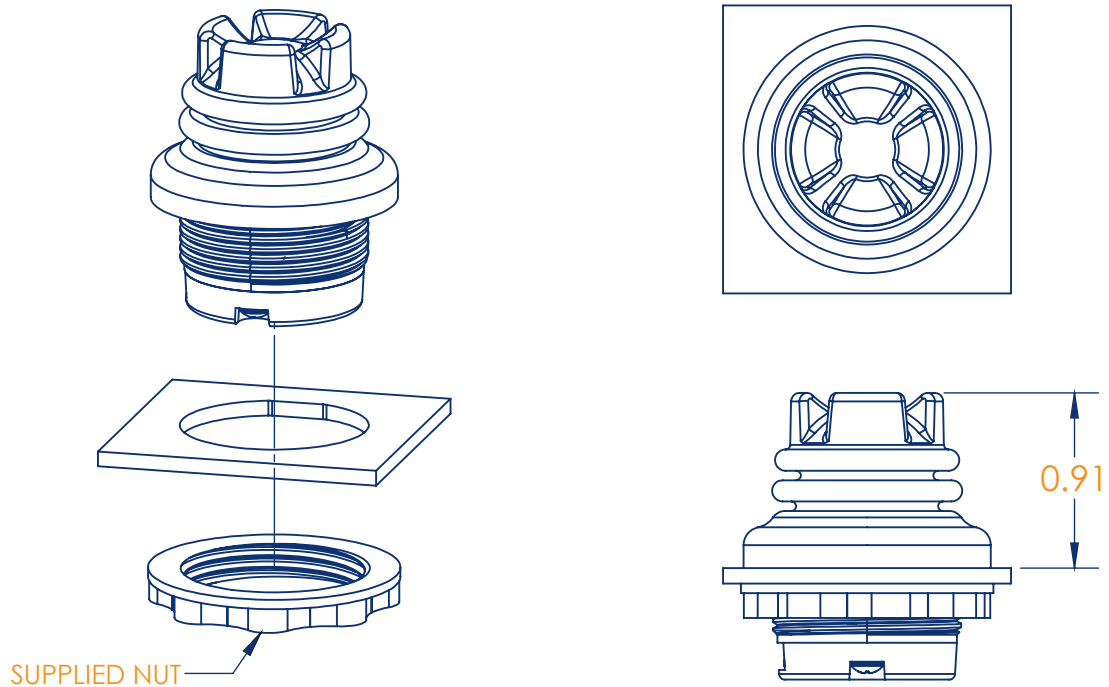
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THREADED HOUSING



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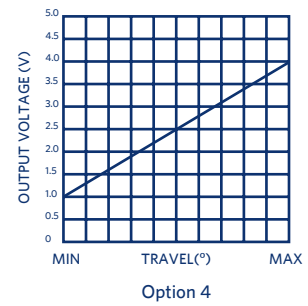
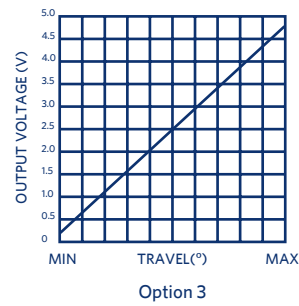
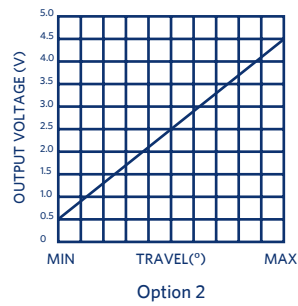
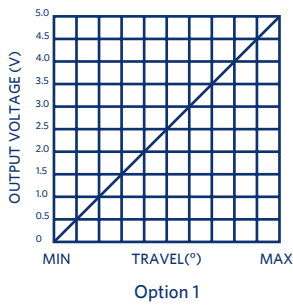
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VOLTAGE OUTPUT OPTIONS



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